

WE CLAIM:

- A system for managing a network comprising:
- a first network element;

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- a second network element connected to said first network element;
- a network management system connected to said first and second network elements; and
 - wherein said first and second network elements each include means for encoding a unique identifier associated with each of said network elements, a processor coupled to said encoding means, and means for physical layer auto-discovery.
 - 2. The system in accordance with claim 1 wherein said means for physical layer auto-discovery comprises:
 - a program storage device readable by a processor and tangibly embodying a program of instructions executable by the processor to perform a method of communicating connectivity information between said first and second network elements, the method comprising the steps:
 - sending a request packet at the physical layer from the first network element to the second network element;
 - receiving a respond packet at the physical layer in response to said sent request packet.
 - 3. The system in accordance with claim 2 wherein said request packet comprises a first packet protocol identifier, a sequence number, and a first padding.
- 4. The system in accordance with claim 2 wherein said response packet comprises a second packet protocol identifier, said sequence number, a far end electronic serial number, a far end port identifier, and a second padding.

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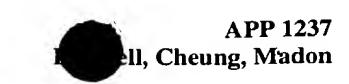
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- 5. The system of claim 1 wherein said first network element is connected to said second network element by an optical fiber link.
- 6. A method for automatically discovering a network topology comprising the steps of:
- assigning an electronic serial number and unique port identifier to a network element;
- representing the network element in a network management system based on said assigned electronic number;
 - communicating connectivity information between the network element and a neighboring network element based on said assigned electronic serial number and unique port identifier; and
 - communicating said connectivity information to the network management system so that the connectivity information is associated with said representation of the network element.
 - 7. The method in accordance with claim 6 wherein said step of assigning an electronic serial number comprises the steps of assigning a network element model number and a network element serial number.
 - 8. The method in accordance with claim 6 wherein said step of representing the network element in a network management system comprises the step of assigning a CORBA object to the network element and associating the CORBA object with said assigned electronic serial number.
 - 9. A network element comprising means for encoding an electronic serial number associated with each the network element, a processor coupled to said encoding means, and means for physical layer auto-discovery coupled to said processor and wherein said processor uses the encoded electronic serial number



- and the autodiscovery means to discover all other network elements linked to the
- 6 network element.
- 1 10. A request packet for use in a physical layer auto-discovery protocol comprising a packet protocol identifier, a sequence number, and padding.
- 1 11.A response packet for use in a physical layer auto-discovery protocol
- 2 comprising a packet protocol identifier, a sequence number, a far end electronic
- serial number, a far end port identifier, and padding.